

LISTING OF CLAIMS

The listing of claims provided below replaces all prior versions, and listings, of claims in the application.

- 5 1. (Currently Amended) An apparatus for use in a chemical mechanical planarization (CMP) system, comprising;
- a head capable of being positioned at a proximate location over a polishing pad between a fluid delivery device and a wafer carrier, the head including,
- an input defined in the head, the input capable of delivering a fluid at the
- 10 proximate location and onto the surface of a polishing pad; and
- an output in the head, the output being oriented adjacent to the input, the output capable of removing at least part of the fluid delivered onto the surface of the polishing pad.

- 15 2. (Original) The apparatus of claim 1, wherein the head is moveable.

 3. (Original) The apparatus of claim 1, wherein the head may contain a plurality of additional inputs and outputs.

- 20 4. (Original) The apparatus of claim 1, wherein a plurality of the heads may be configured to span an application area.

 5. (Original) The apparatus of claim 1, wherein the proximate location of the head over the polishing pad is between about 0.1 mm and about 1 mm.

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6. (Original) The apparatus of claim 1, wherein the input is formed in the head by one of milling, drilling, boring, and casting.

7. (Original) The apparatus of claim 6, wherein the input formed in the head may
5 include at least one conduit.

8. (Original) The apparatus of claim 1, wherein the fluid may be one of an abrasive-free chemically inert liquid, deionized water and a process indifferent fluid.

10 9. (Original) The apparatus of claim 1, wherein the output is capable of removing materials present on the polishing pad.

10. (Original) The apparatus of claim 10, wherein the materials on the polishing pad capable of being removed by the output may be one or a combination of slurry, de-
15 ionized water, isopropyl alcohol, particulates, abrasives, material residues, and pad residues.

11. (Original) The apparatus of claim 10, wherein removal of slurry adjusts a degree of planarization by the CMP system.

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12. (Original) The apparatus of the claim 1, further comprising a computer.

13. (Original) The apparatus of the claim 12, wherein the computer is capable of communication with a sensor located on the CMP system.

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14. (Original) The apparatus of the claim 13, wherein the sensor is capable of detecting material properties of a substrate including film thickness, conductivity, surface roughness, and topography height variations.

5 15. (Original) The apparatus of the claim 12, wherein the computer is capable of providing control over operation of the head.

16. (Currently Amended) A method for controlling properties of a film over a polishing pad surface, comprising:

10 delivering a fluid over the polishing pad, the delivery being at a proximate location over the polishing pad surface between a fluid delivery device and a wafer carrier; and

removing at least part of the fluid from over the polishing pad surface, the removing configured to occur at a proximate location over the polishing pad surface and
15 adjacent to the delivery of the fluid.

17. (Original) The method for controlling properties of a film over a polishing pad surface as recited in claim 16, wherein the delivering and removing is configured to assist in controlling properties of the film over the polishing pad surface.

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18. (Original) The method for controlling properties of a film over a polishing pad surface as recited in claim 17, wherein the film includes one or more of a slurry, an amount of de-ionized water, an amount of chemicals, isopropyl alcohol, particulates, abrasives, material residues, and pad residues.

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19. (Original) The method of claim 16, wherein the removing of slurry from the film adjusts a degree of planarization capable of being imparted by the polishing pad surface.

5 20. (Original) An apparatus capable of controlling a chemical mechanical polishing (CMP) system, comprising;
a sensor;
a computer; and
a head capable of being positioned at a proximate location over a polishing pad,
10 the head including,
an input defined in the head, the input capable of delivering a fluid at the proximate location and onto the surface of a polishing pad; and
an output in the head, the output being oriented adjacent to the input, the output capable of removing at least part of the fluid delivered onto the surface of the polishing
15 pad.

21. (Original) The apparatus of the claim 20, wherein the computer is capable of communication with the sensor located on the CMP system.

20 22. (Original) The apparatus of the claim 20, wherein the sensor is capable of detecting material properties of a wafer surface being processed.

23. (Original) The apparatus of the claim 22, wherein material properties includes film thickness, conductivity, surface roughness, and topography height
25 variations.

24. (Original) The system of claim 20, wherein the sensor is an inductive sensor.

25. (Original) The apparatus of the claim 20, wherein the computer is capable of providing control over operation of the head.

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26. (Original) The apparatus of claim 20, wherein the head is connected to a movable arm.

27. (Original) The apparatus of claim 20, wherein the head contains a plurality
10 of additional inputs and outputs.

28. (Original) The apparatus of claim 20, wherein a plurality of heads defined by two or more of the heads is configured to span an application area.

15 29. (Original) The apparatus of claim 20, wherein the proximate location of the head over the polishing pad is between about 0.1 mm and about 1 mm.

30. (Original) The apparatus of 20, wherein the input formed in the head may include at least one conduit.

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31. (Original) The apparatus of claim 20, wherein the fluid may be one or a combination of an abrasive-free chemically inert liquid and deionized water.

32. (Original) The apparatus of claim 20, wherein the output is capable of
25 removing materials present on the polishing pad.

33. (Original) The apparatus of claim 32, wherein the materials on the polishing pad capable of being removed by the output may be one or a combination of slurry, de-ionized water, isopropyl alcohol, particulates, abrasives, material residues, and pad residues.

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34. (Original) The apparatus of claim 32, wherein removal of slurry adjusts a degree of planarization by the CMP system.

35. (Currently Amended) An apparatus for use in a chemical mechanical
10 planarization (CMP) system, comprising;

a head capable of being positioned at a proximate location over a polishing pad
between a fluid delivery device and a wafer carrier, the head including,

an output defined in the head and capable of being positioned at the proximate
location over the polishing pad , the output being configured to enable removal of a
15 material present on the surface of the polishing pad; and

an input defined in the head and capable of being positioned at the proximate
location over the polishing head, the input capable of delivering a fluid to the surface of
the polishing pad to at least partially replace the material that is configured to be removed
by the output, the output being positioned on the head adjacent to the input.

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36. (Original) The apparatus of claim 35, wherein the head is moveable.

37. (Original) The apparatus of claim 34, wherein the proximate location of the
head over the polishing pad is between about 0.1 mm and about 1 mm.

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38. (Original) The apparatus of claim 35, wherein the material present on the surface of the polishing pad may be one or a combination of slurry, de-ionized water, isopropyl alcohol, particulates, abrasives, material residues, and pad residues.

5 39. (Original) The apparatus of claim 35, wherein the fluid may be one of an abrasive-free chemically inert liquid, deionized water and a process indifferent fluid.

40. (Original) The apparatus of the claim 35, further comprising a computer capable of communication with a sensor located on the CMP system.

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41. (Original) The apparatus of the claim 40, wherein the sensor is capable of detecting material properties of a substrate including film thickness, conductivity, surface roughness, and topography height variations.

15 42. (Original) The apparatus of the claim 40, wherein the computer is capable of providing control over operation of the head.